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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,812	11/18/2003	Hyeong-Gon Noh	50808/DBP/Y35	8038
23363	7590	11/02/2006	EXAMINER	
CHRISTIE, PARKER & HALE, LLP			DOVE, TRACY MAE	
PO BOX 7068			ART UNIT	
PASADENA, CA 91109-7068			PAPER NUMBER	

1745

DATE MAILED: 11/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/716,812

Applicant(s)

NOH, HYEONG-GON

Examiner

Tracy Dove

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 3 IDSs.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

The information disclosure statements (IDS) submitted on 11/18/03, 7/13/04 and 5/19/06 have been considered by the examiner.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 5-7, 11-15, 17-21, 22 and 25-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 recites "wherein the organic solvent is an ester-based organic solvent", which lacks proper antecedent basis. Examiner suggests "wherein the ester-based organic solvent is selected ...".

Claims 5 should recite "wherein the non-aqueous organic solvent further comprises a carbonate-based solvent...".

Claim 6 should recite "wherein the carbonate-based solvent is selected..." to provide proper antecedent basis.

Claim 7 should recite "wherein the aromatic hydrocarbon organic solvent is represented by..." to provide proper antecedent basis.

Claim 11 recites “the carbonate groups comprise cyclic and/or linear carbonates”, which is indefinite. A “group” does not “comprise” the compound. Furthermore, “and/or” should be removed from all claims because the term is indefinite. See also claim 25.

Claim 17 should recite “wherein the non-aqueous organic solvent further comprises a secondary additive...”.

Claim 22 recites “the secondary additive compound”, which lacks proper antecedent basis. It appears claim 22 should depend from claim 17 instead of claim 16.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-12, 16-19, 23-26 and 30-32 are rejected under 35 U.S.C. 102(e) as being anticipated by Iwamoto et al., US 6,958,198.

Iwamoto teaches a non-aqueous electrolyte for a lithium secondary battery (1:5-10). The non-aqueous electrolyte includes an organic solvent, at least one lithium salt and an additive compound. Iwamoto teaches a specific electrolyte comprising ethylene carbonate (EC) and  $\gamma$ -butyrolactone (GBL) at a volume ratio of 1:3 mixed with a lithium hexafluorophosphate salt ( $\text{LiPF}_6$ ) to prepare 1.2 M of a  $\text{LiPF}_6$ -EC/GBL electrolyte. A surface active agent (additive) was added in amounts of 0.1, 1.0, 2.0 and 5.0 wt% (16:35-45). Example 24 teaches the surface active agent is diethyl dicarbonate (at least two carbonate groups) (Table 7). GBL is an ester-based

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organic solvent and EC is the additional carbonate-based solvent of claim 5. Iwamoto teaches at least one of the electrolyte additives is selected from a carbonic acid ester, a sulfur compound or a combination thereof. The sulfur compound may be sulfolane or sulfolene in an amount of 0.1-10 parts by weight (6:41-67). Vinylene carbonate is an example of an especially preferred carbonic acid ester (6:28-40). The vinylene carbonate is added in an amount of 0.1-10 parts by weight. See also column 7, lines 50 through column 8, lines 31. Lithium salts are disclosed at 10:23-67 and 11:41-45. The negative electrode material may be lithium or a material capable of doping and dedoping lithium (12:11-29). The positive electrode material may be a lithium-nickel-based or lithium-nickel-manganese-based compound (13:31-48).

Thus the claims are anticipated.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamoto et al., US 6,958,198 in view of Hamamoto, JP 11-329494.

Iwamoto teaches a non-aqueous electrolyte for a lithium secondary battery (1:5-10). The non-aqueous electrolyte includes an organic solvent, at least one lithium salt and an additive compound. Iwamoto teaches a specific electrolyte comprising ethylene carbonate (EC) and  $\gamma$ -butyrolactone (GBL) at a volume ratio of 1:3 mixed with a lithium hexafluorophosphate salt ( $\text{LiPF}_6$ ) to prepare 1.2 M of a  $\text{LiPF}_6$ -EC/GBL electrolyte. A surface active agent (additive) was

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added in amounts of 0.1, 1.0, 2.0 and 5.0 wt% (16:35-45). Example 24 teaches the surface active agent is diethyl dicarbonate (at least two carbonate groups) (Table 7). GBL is an ester-based organic solvent and EC is the additional carbonate-based solvent of claim 5. Iwamoto teaches at least one of the electrolyte additives is selected from a carbonic acid ester, a sulfur compound or a combination thereof. The sulfur compound may be sulfolane or sulfolene in an amount of 0.1-10 parts by weight (6:41-67). Vinylene carbonate is an example of an especially preferred carbonic acid ester (6:28-40). The vinylene carbonate is added in an amount of 0.1-10 parts by weight. See also column 7, lines 50 through column 8, lines 31. Lithium salts are disclosed at 10:23-67 and 11:41-45. The negative electrode material may be lithium or a material capable of doping and dedoping lithium (12:11-29). The positive electrode material may be a lithium-nickel-based or lithium-nickel-manganese-based compound (13:31-48).

Iwamoto does not explicitly disclose vinyl sulfone is the sulfur compound additive.

However, Hamamoto teaches a lithium secondary battery comprising an electrolyte solution having an electrolyte salt dissolved in a non-aqueous solvent. A vinyl sulfone is added to the electrolyte solution (abstract)

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to use the vinyl sulfone of Hamamoto for the sulfur compound of Iwamoto because a lithium secondary battery with excellent battery characteristics such as cycle life and electrical capacity would have resulted (see abstract of Hamamoto) (012-0014). Note Hamamoto teaches many of the same solvents and salts as those disclosed by Iwamoto (0015-0017).

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

October 30, 2006

  
TRACY DOVE  
PRIMARY EXAMINER